Amendments to the Specification

Please replace the paragraph on page 8, beginning on line 30, with the following amended paragraph:

In embodiments the system 100 can respond to control of a user interface 4908, which may provide control directly to the lighting unit 102, such as through a switch, dial, button, dipswitch, slide mechanism, or similar facility or may provide control through another facility, such as a network interface ~~4902~~, a light system manager 5000, or other facility.

Please replace the paragraph on page 10, beginning on line 1, with the following amended paragraph:

While embodiments of a control facility 3500 may be as simple as a single processor 3600, data storage facility 3700 and drive hardware 3802, in other embodiments more complex control facilities 3500 are provided. Control facilities may include more complex drive facilities ~~3800~~ 3802, including various forms of drive hardware ~~3802~~, such as switches, current sinks, voltage regulators, and complex circuits, as well as various methods of driving ~~4300~~, including modulation techniques such as pulse-width-modulation, pulse-amplitude-modulation, combined modulation techniques, table-based modulation techniques, analog modulation techniques, and constant current techniques. In embodiments a control facility 3500 may include a combined power/data protocol ~~4800~~ for controlling light sources 300 in response to data delivered over power lines.

Please replace the paragraph on page 10, beginning on line 19, with the following amended paragraph:

The control interface 4900 may include a network interface ~~4902~~, such as for handling network signals according to any desired network protocol, such as DMX, Ethernet, TCP/IP, DALI, 802.11 and other wireless protocols, and linear addressing protocols, among many others. In embodiments the network interface ~~4902~~ may support multiple protocols for the same lighting unit 102.

Please replace the paragraph on page 11, beginning on line 6, with the following amended paragraph:

In embodiments the control facility 3500 may include an authoring facility 7400 for authoring effects 9200, including complex shows, static and dynamic effects. The authoring facility 7400 may be associated with the light system manager 5000 as part of an operating system 5048, such as to facilitate delivery of control signals for complex shows and effects over a ~~network~~ control interface 4900 to one or more lighting units 102. The authoring facility 7400 may include a geometric authoring facility, an interface for designing light shows, an object-oriented authoring facility, an animation facility, or any of a variety of other facilities for authoring shows and effects.

Please replace the paragraph on page 11, beginning on line 15, with the following amended paragraph:

In embodiments the control facility 3500 may take input from a signal ~~sources~~ source 8400, such as a sensor 8402, an information source, a light system manager 5000, a user interface 4908, a ~~network~~ control interface 4900, a physical data interface 4904, an external system 8800, or any other source capable of producing a signal.

Please replace the paragraph on page 18, beginning on line 18, with the following amended paragraph:

An optical facility 400 may be a ~~diffuse.~~ diffuser. A diffuser may absorb and scatter light from a source 300, such as to produce a glowing effect in the diffuser. Diffusers can take many different shapes, such as tubes, cylinders, spheres, pyramids, cubes, tiles, panels, screens, doughnut shapes, V-shapes, T-shapes, U-shapes, junctions, connectors, linear shapes, curves, circles, squares, rectangles, geometric solids, irregular shapes, shapes that resemble objects found in nature, and any other shape. Diffusers may be made of plastics, polymers, hydrocarbons, coated materials, glass materials, crystals, micro-lens arrays, fiber optics, or a wide range of other materials.

Please replace the paragraph on page 20, beginning on line 20, with the following amended paragraph:

~~Referring to Fig. 8, h~~Housings 800 may include many types, such as a housing for an architectural lighting fixture, such as a wall-washing fixture. Housings may be square, rectangular, circular, cylindrical, or linear. Housings 800 may be configured to resemble retrofit bulbs, fluorescent bulbs, incandescent bulbs, halogen lamps, high-intensity discharge lamps, or other kinds of bulbs and lamps. Housings 800 may be configured as tiles or panels, such as for wall-hangings, walls, ceiling tiles, or floor tiles. Housings 800 may be configured to resemble neon lights, such as for signs, logos, or decorative purposes. Housings 800 may be configured to highlight architectural features, such as lines of a building, room or architectural feature.

Please replace the paragraph on page 23, beginning on line 4, with the following amended paragraph:

Referring to Fig. 5, the housing 800 can be small and round, such as about ten millimeters in diameter (and can be designed with the same or similar configuration at many different scales.) The housing 800 may include a power facility, a mounting facility and an optical facility. The housing 800 and optical facility can be made of metals or plastic materials suitable for medical or surgical use. Fig. 5A shows a front view and Fig. 5B shows a side view.

Please replace the paragraph on page 24, beginning on line 8, with the following amended paragraph:

Referring to Fig. 8, ~~I~~in embodiments a lighting unit 102 may be embedded into a sponge 802, such as for a surgical application. The sponge 802 can be used in any surgical or medical application where absorption is required, while simultaneously supplying light to a work area, such as a body cavity.

Please replace the paragraph on page 25, beginning on line 10, with the following amended paragraph:

In embodiments a retractor 912 is augmented with an attached or integrated light source 908, wherein the power and light is provided at one end of the tool and piped through a fiber

optic cable 904 to the far end of the tool for illumination purposes. The advantage of the fiber optic plane or even an electroluminescent device is the cool diffuse illumination that it provides. In other embodiments the light source 300 is an LED.

Please replace the paragraph on page 28, beginning on line 14, with the following amended paragraph:

Referring to Fig. 10, in embodiments, such as for a surgical light, a light source 300 can be configured with an off-axis mounting facility 1010. The embodiment can alternatively include a shade 1012 that selectively allows light to shine through in certain areas and not in others. These techniques can be used to reduce glare and light shining directly into the eyes of a user of the lighting unit 102. Snap-on lenses can be used atop the light-emitting portion to allow for a much wider selection of light patterns and optical needs. In embodiments a disk-shaped light source 300 emits light in one off-axis direction. The light can then be rotated about the center axis to direct the light in a desired direction. The device may be simply picked up, rotated, and placed back down using the fastening means such as magnetic or clamp (see below for more fastening options) or may simply incorporate a rotational mechanism.

Please replace the paragraph on page 28, beginning on line 26, with the following amended paragraph:

Referring to Fig. 11, a mechanical interface 3200 may be provided for connecting a lighting unit 102 or light source 300 mechanically to a platform, housing 800, mounting, board, other lighting unit 102, or other product or system. In embodiments the mechanical interface 3200 may be a modular interface ~~3202~~ for removeably and replaceably connecting a lighting unit 102 to another lighting unit 102, ~~or~~ to a board 204 or to an object. The board 204 may comprise a lighting unit 102, or it may comprise a power facility for a lighting unit 102. The modular interface may, for example, be a clip 1110 for connecting the lighting unit 102 to a chart or similar object in a medical or surgical environment. The interface 3200 may include a clamp 1112 or a fastener 1114, such as a screw, for connecting the lighting unit 102 to an object.

Please replace the paragraph on page 29, beginning on line 19, with the following amended paragraph:

Referring to Fig. 12, medical and surgical fastening materials include bone wax 1210; a beeswax compound (sometimes mixed with Vaseline), which can be hand, molded, and can also be used for holding the lighting device 102. The exterior of the lighting device 102 can be textured to provide grip and holding power to facilitate the fastening. Surgical tapes 1212, such as DuoPlas from Sterion, are another example of materials that can be used to fasten the light to tools, instruments, and drapes or directly to the patient.

Please replace the paragraph on page 32, beginning on line 17, with the following amended paragraph:

The drive facility 3800 of Fig. 2 may include drive hardware 3802 for driving one or more light sources 300. In embodiments the drive hardware 3802 comprises a switch 3900, such as for turning on the current to a light source 300. In embodiments the switch 3900 is under control of a processor, so that the switch 3900 can turn on or off in response to control signals. In embodiments the switch turns on and off in rapid pulses, such as in pulse width modulation of the current to the LEDs, which results in changes in the apparent intensity of the LED, based on the percentage of the duty cycle of the pulse width modulation technique during which the switch is turned on.

Please replace the paragraph on page 33, beginning on line 1, with the following amended paragraph:

As shown in Fig. ~~1~~ 2, the lighting unit 102 also may include the processor 3600 that is configured to output one or more control signals to drive the light sources 300 so as to generate various apparent intensities of light from the light sources. For example, in one implementation, the processor 3600 may be configured to output at least one control signal for each light source so as to independently control the intensity of light generated by each light source. Some examples of control signals that may be generated by the processor to control the light sources include, but are not limited to, pulse modulated signals, pulse width modulated signals (PWM), pulse amplitude modulated signals (PAM), pulse displacement modulated signals, analog control

signals (e.g., current control signals, voltage control signals), combinations and/or modulations of the foregoing signals, or other control signals. In one aspect, the processor 3600 may control other dedicated circuitry that in turn controls the light sources so as to vary their respective intensities.

Please replace the paragraph on page 38, beginning on line 1, with the following amended paragraph:

Referring to Fig. 13, a chromaticity diagram 1300 shows a range of colors that can be viewed by the human eye. The gamut 1314 defines the range of colors that it is possible to produce by additively mixing colors from multiple sources, such as three LEDs. Green LEDs produce light in a green region 1312, red LEDs produce light in a red region 1318 and blue LEDs produce light in a blue region ~~1312~~1316. Mixing these colors produces mixed light output, such as in the overlapping areas between the regions, including those for orange, purple and other mixed light colors. Mixing all three sources produces white light, such as along a black body curve 1310. Different mixtures produce different color temperatures of white light along or near the black body curve 1310. Typically an LED produces a narrow emission spectrum centered on a particular wavelength; i.e. a fixed color and a single point on the chromaticity diagram. Through the use of multiple LEDs and additive color mixing a variety of apparent colors can be produced.

Please replace the paragraph on page 41, beginning on line 7, with the following amended paragraph:

Referring to Fig. 14, a flow diagram 1450 shows steps for providing a medical tool with a lighting system 100. First, at a step 1452, a non-lighting tool is provided. Second, a lighting unit 102 is integrated into the tool 1454. Finally, the user can control the light output of the tool by controlling the lighting unit 102.

Please replace the paragraph on page 41, beginning on line 26, with the following amended paragraph:

The authoring of the shows may be based on geometry and an object-oriented programming approach, such as the geometry of the light systems that are discovered and mapped using the mapping facility, according to various methods and systems disclosed herein or known in the art. Also provided is a light system engine 5800, for playing lighting shows by executing code for lighting shows and delivering lighting control signals, such as to one or more lighting systems, or to related systems, such as power/data systems, that govern lighting systems. Further details of the light system manager 5000, mapping facility 5002, light system composer 5004 and light system engine 5008 are provided herein.

Please replace the paragraph on page 42, beginning on line 29, with the following amended paragraph:

Referring still to Fig. 17, in an architecture for delivering control systems for complex shows to one or more light systems, shows that are composed using the authoring computer 5010 are delivered via an Ethernet connection through one or more Ethernet switches to the light system engine 5008. The light system engine 5008 downloads the shows composed by the light system composer 5004 and plays them, generating lighting control signals for light systems. In embodiments, the lighting control signals are relayed by an Ethernet switch to one or more power/data supplies and are in turn relayed to light systems that are equipped to execute the instructions, such as by turning LEDs on or off, controlling their color or color temperature, changing their hue, intensity, or saturation, or the like. In embodiments the power/data supply may be programmed to receive lighting shows directly from the light system composer 5004. In embodiments a bridge 1752 may be programmed to convert signals from the format of the light system engine 5008 to a conventional format, such as DMX or DALI signals used for entertainment lighting.

Please replace the paragraph on page 46, beginning on line 6, with the following amended paragraph:

Fig. ~~162~~ illustrates one of many possible examples of a networked lighting system 100 in which a number of lighting units 102 are coupled together to form the networked lighting system.

Please replace the paragraph on page 60, beginning on line 15, with the following amended paragraph:

The light system composer ~~5008~~5004 can be provided, running on the authoring computer 5010, for authoring lighting shows comprised of various lighting effects. The lighting shows can be downloaded to the light system engine ~~5008~~5004, to be executed on lighting units 102. The light system composer 5008 is preferably provided with a graphical user interface, with which a lighting show developer interacts to develop a lighting show for a plurality of lighting units 102 that are mapped to locations through the mapping facility 5002. The user interface supports the convenient generation of lighting effects, embodying object-oriented programming approaches.

Please replace the paragraph on page 66, beginning on line 20, with the following amended paragraph:

Fig. 21 ~~further~~ depicts a positioning arm 2032, a control module 2012 and a cable 2034 through which can pass the electrical signal to the LED system 2028, and the data signal to the lighting unit 102. Optionally, a data signal can pass to the sensor module (not shown) from a signal source 8400, such as a sensor. The cable 2034 can carry these sensor signals. The control module 2012 in the illustrated embodiment can contain the ~~processor 3600, the~~ power facility 1800, the sensor module for the sensor system and a processor 3600 for relating the signals received by the sensor system to the processor 3600, so that signals received by the sensor module affect the output characteristics of the lighting unit 102. The control module can further include a position controller (not shown). In the illustrated embodiment the positioning system 2010 comprises the positioning arm 2032, the position controller and a cable 2034. This depiction of a positioning system is merely illustrative. As the term is used herein, a positioning system is understood to include any system capable of positioning the lighting unit 102 in a spatial relationship with the material being illuminated whereby the lighting unit 102 illuminates the material. A positioning system, therefore, can include an apparatus of any kind capable of positioning the lighting unit 102. A positioning system can comprise a human operator who is capable of positioning the lighting unit 102 in a spatial relationship with the material being illuminated whereby the lighting unit 102 illuminates the material. A positioning system can

further comprise the cable if the cable is adapted for positioning the lighting unit 102 in a spatial relationship with the material being illuminated.

Please replace the paragraph on page 77, beginning on line 9, with the following amended paragraph:

As an alternate embodiment, the lighting unit 102 can be combined with a sensor system that provides signals that correlate with some characteristic of the body part being illuminated. As an example, Fig. 25 shows a lighting unit ~~100~~102 affixed to a nasal endoscope 2092 being inserted transnasally 2094 to evaluate an intranasal or a pituitary tumor 2098. The endoscope 2092 is shown in this figure entering through the naris 2096 and being passed through the nasal airway 2086. The tumor 2098 is here shown at the superior aspect of the nasal airway 2086. The LED assembly 2100 can comprise an LED system (not shown) and a sensor system (not shown). The LED system can illuminate the intranasal and intrasellar structures with a range of colors, while the sensor system can provide data relating to the characteristics of the reflected light. The tumor 2098 can be identified by how it reflects the range of light being used to illuminate it. The sensor system can provide information about the characteristics of the reflected light, permitting the operator to identify the tumor 2098 in these remote locations. Further, such an endoscope 2092 can be combined with means familiar to practitioners in these arts for resecting or ablating a lesion.

Please replace the paragraph on page 84, beginning on line 9, with the following amended paragraph:

Fig. ~~20~~28 shows a practice of these methods. This figure depicts a patient 2180 afflicted with a lesion 2172 on an external surface, here shown to be his cheek. A lighting unit 102 is directed to provide direct illumination to the lesion 2172. Here the lighting unit 102 is shown affixed to the distal end of a positioning system 2182. Other arrangements for positioning the lighting unit 102 can be envisioned by those of ordinary skill in these arts. It is understood that illumination of dermatological lesions with different spectra of light can have therapeutic effect. For example, acne, Bowen's disease of the penis and certain other skin cancers have responded to treatment with illumination. As another example, certain intranasal conditions are understood to

respond to illumination therapies. In one practice of these methods, an agent can be administered to the patient that alters or increases the therapeutic effect of the set of colors of light directed towards the area being treated.